

ORIGINAL
OPEN MEETING



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MEMORANDUM

Arizona Corporation Commission

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DOCKET CONTROL

TO: THE COMMISSION

FROM: Utilities Division

DATE: May 10, 2011

DOCKETED BY

RE: MOHAVE ELECTRIC COOPERATIVE, INC. – APPLICATION FOR APPROVAL OF A WASTE-TO-ENERGY FACILITY AS A PILOT PROGRAM UNDER THE RENEWABLE ENERGY RULES OR, IN THE ALTERNATIVE, FOR A LIMITED WAIVER (DOCKET NO. E-01750A-10-0453)

Introduction

On November 5, 2010, Mohave Electric Cooperative, Inc. (“MEC” or the “Cooperative”) filed its Application for Approval of a Waste-to-Energy Facility as a Pilot Program under the REST Rules or, in the Alternative, for a Limited Waiver (“Application”).

In its Application, MEC is requesting that the Arizona Corporation Commission (“Commission” or “ACC”) either (1) recognize energy produced at a single municipal waste-to-energy (“WTE”) facility owned, operated or developed by Reclamation Power Group, LLC (“RPG”) as a pilot program pursuant to Arizona Administrative Code (“A.A.C.”) R14-2-1802(D) or (2) grant a waiver, pursuant to A.A.C. R14-2-1816(A), to the extent necessary to recognize the energy produced at this WTE facility as an “Eligible Renewable Energy Resource” as defined by A.A.C. R14-2-1802. Under either scenario, MEC is seeking to have the facility qualify for “Renewable Energy Credits” under A.A.C. R14-2-1803 and be eligible to satisfy the annual renewable energy requirements established by A.A.C. R14-2-1804.

RPG is an Arizona limited liability company, formed in 2008, that is currently in good standing with the State of Arizona. The facility developed by RPG would use steam produced from the direct combustion of residential municipal solid waste (“MSW”) to run a turbine and electric generator. The anticipated facility would receive approximately 500 tons per day of MSW, 25 percent of which may be recycled. The City of Phoenix and surrounding areas generate in excess of 10,000 tons of MSW per day. Although the proposed facility would provide residents in MEC’s territory with power, the location of the planned facility would be in the Phoenix Metropolitan area. However, an actual site for the facility has yet to be determined.

The net output of the planned facility would be 11 megawatts (“MW”). WTE facilities provide baseload power. This facility could potentially supply MEC’s customers with more than 86,000 megawatt-hours (“MWh”) of energy on an annual basis (assuming a 90 percent capacity factor). RPG has indicated that the facility would support approximately 40 direct jobs and a

number of indirect jobs related to contract services, such as housekeeping, legal, and ash disposal.

Waste-to-Energy

In the United States, there are currently 87 WTE facilities operating in 24 states, generating approximately 2,500 MW, or about 0.3 percent of total national power generation.¹

MSW as a Renewable Resource

Treatment of MSW as a renewable resource varies at both the state and federal level. Some state renewable portfolio standards include all or part of MSW-fueled generation as renewable while others exclude MSW entirely.² At the federal level, the treatment of MSW as a form of renewable energy varies across programs, laws and even within sections of the same body of law.³

The Energy Information Administration ("EIA") recently examined how it classifies MSW as a renewable resource and found that it had sufficient information to separate the energy produced from MSW into biogenic and non-biogenic portions.⁴ EIA included the following items as biogenic material: newsprint, paper, containers and packaging, textiles, yard trimmings, food wastes, wood, and leather. The EIA identified non-biogenic material to include plastics and rubber.

¹ U.S. Environmental Protection Agency. Municipal Solid Waste, Electricity from Municipal Solid Waste. <http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html>

² For example, Connecticut (Conn. Gen. Stat. §16-245a et seq.), the District of Columbia (D.C. Code § 34-1431 et seq.), Maryland (Md. Public Utility Companies Code § 7-701 et seq.), Massachusetts (M.G.L. ch. 25A, § 11F), New Jersey (N.J. Stat. § 48:3-49 et seq.), and Pennsylvania (73 P.S. § 1648.1 et seq.) allow energy from MSW to be partially counted toward compliance with a renewable portfolio standard. Hawaii (HRS § 269-91 et seq.), Iowa (Iowa Code § 476.41 et seq.), Maine (35-A M.R.S. § 3210), Michigan (MCL § 460.1021 et seq.), Minnesota (Minn. Stat. § 216B.1691), Nevada (NRS 704.7801 et seq.), Utah (Utah Code 54-17-101 et seq.) allow for energy from MSW to count completely toward RPS compliance. Delaware (26 Del. C. § 351 et seq.), Illinois (§ 20 ILCS 3855/1-75), Texas (Texas Utilities Code § 39.904), Vermont (30 V.S.A. § 8001 et seq.) and Washington (WAC 194-37) specifically prohibit the use of MSW for purposes of generating renewable energy.

³ Energy Information Administration. Methodology for Allocating Municipal Solid Waste to Biogenic and Non-Biogenic Energy. May 2007. "For example, the definition of renewable energy in Section 203 of the Energy Policy Act of 2005 explicitly includes MSW-derived electricity as a "renewable energy" resource eligible to satisfy the federal renewable energy purchase requirement established in that section. Yet, many other sections of the same bill do not include MSW as an eligible renewable energy source for purposes of programs that aim to develop, assess, or support renewable energy."

http://www.eia.doe.gov/cneaf/solar/renewables/page/mswaste/msw_report.html

⁴ Although it is not meant as a definitive source for the treatment of MSW, the EIA issued a "Methodology for Allocating Municipal Solid Waste to Biogenic/Non-Biogenic Energy" detailing the methodology it used to distinguish between biogenic and non-biogenic energy in MSW.

http://www.eia.doe.gov/cneaf/solar/renewables/page/mswaste/msw_report.html

In 2008, the most recent year for which data is available, biogenic MSW accounted for almost 6 percent of the renewable energy consumed in the United States.⁵

MEC provided Staff with a breakdown, by category, of an MSW sample from the City of Glendale Materials Recovery Facility as an example of the MSW that could be used as fuel for the proposed RPG facility. Prior to recycling, the MSW, assumed to be typical of that in the Phoenix Metropolitan area, is composed of about 82 percent biogenic material, 12 percent non-biogenic material, and 6 percent non-combustible material, such as glass and metal. After taking recycling rates into account, the biogenic material accounts for about 95 percent of the waste stream, with non-biogenic and non-combustible materials accounting for only approximately 2 percent and 3 percent of the waste stream, respectively.

Although the biogenic material may count for approximately 95 percent of the MSW stream after recycling, the biogenic material does not contribute 95 percent of the energy to the system to produce electricity. The remaining components of the MSW burn at various heat rates. Using heat rate factors from the EIA, the biogenic material contributes about 91 percent of the energy to the process while non-biogenic materials contribute about 9 percent of the energy to the process with the non-combustibles contributing nothing (glass and metal do not burn to produce energy).

Until recently, calculation of energy from renewable content was accounted for by gross estimation of combustion fuel sources, similar to the description of the MSW composition discussed above. Recently, however, another method was developed out of the U.S. Department of Agriculture's BioPreferred program. This program prefers manufacturers of products derived from renewable resources.⁶

ASTM-D6866 is a standardized method of identifying the carbon-14 isotope ("C14") and providing a value of renewable carbon content within any solid, liquid or gas.⁷ The test methods are applicable to any product containing carbon-based components that can be combusted in the presence of oxygen to produce carbon dioxide ("CO₂") gas.⁸ The overall analytical method is also applicable to gaseous samples, including flue gases from electrical utility boilers and waste incinerators.

Recycled CO₂, also known as carbon-neutral CO₂, is carbon dioxide which was removed from the air through plant respiration, then returned to the air through combustion of plant derivatives. Common fuels which produce recycled CO₂ include biomass, ethanol and municipal

⁵ Energy Information Administration. Renewable Energy Annual, Table 1.1 U.S. Energy Consumption by Source. Available at http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/table1_1.xls

⁶ ASTM Standard D6866-10, 2010, "Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis," www.astm.org.

⁷ Institute of Clean Air Companies. Inside the APC Industry, Regulatory Implications of ASTM-D6866. September 2007, Volume 1 Issue 1. p. 4. <http://www.betalabservices.com/PDF/ICAC.pdf>

⁸ ASTM International, ASTM D6866 - 10 Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis. <http://www.astm.org/Standards/D6866.htm>

solid waste. The carbon-14 isotope is present in all plant material and is absent in all fossil fuels.⁹ By measuring the presence of C14 in the air and in emissions from combustion activities directly, the ratio of recycled CO₂ to fossil fuel-based CO₂ can be determined. The basic difference between renewable-based products and petroleum-based products is the presence of modern or ancient origin of the carbon in those products. As such, radiocarbon dating is able to distinguish between the two sources.

The balance method is also currently used to determine the biogenic portion of mixed waste. The balance method uses existing data on the composition of materials and the operating conditions of the WTE plant, and calculates the most probable result based on a mathematical-statistical model. Comparisons between the C14 method and the balance method conducted at three full-scale facilities in Switzerland show that both methods arrive at the same result.¹⁰

Environmental Impacts

In general, the resultant emissions from most thermal power plants will range from most dirty in the case of coal as fuel, to least dirty in the case of natural gas as fuel, with MSW as fuel lying somewhere between the two. All waste-to-energy facilities must comply with the U.S. Environmental Protection Agency's ("EPA") Maximum Achievable Control Technology ("MACT") standards. While MSW may be cleaner than coal, it is not necessarily cleaner than natural gas or other renewable resources, such as wind and solar.

For example, SO₂ emissions from a WTE facility are generally less than those from coal-fired facilities, greater than those from natural gas facilities, and on par with those from biomass and landfill gas-to-energy facilities. NO_x emissions from a WTE facility are generally less than those from coal-fired, landfill gas-to-energy, or biomass facilities but greater than those from natural gas facilities. PM₁₀ emissions from a WTE facility are generally less than those from coal-fired and landfill gas-to-energy facilities but greater than those from natural gas facilities. CO₂ emissions from a WTE facility tend to be less than those from coal-fired and landfill gas-to-energy facilities but greater than those from natural gas and biomass facilities.¹¹

⁹ When plants fix atmospheric CO₂ into organic material during photosynthesis they incorporate a quantity of C14 that approximately matches the level of this isotope in the atmosphere. After plants die or they are consumed by other organisms, the C14 fraction of this organic material declines at a fixed exponential rate due to the radioactive decay of C14.

¹⁰ Wikipedia, Waste-to-energy. <http://en.wikipedia.org/wiki/Waste-to-energy> (citing Fellner, J., Cencic, O. and Rechberger, H., *A New Method to Determine the Ratio of Electricity Production from Fossil and Biogenic Sources in Waste-to-Energy Plants*. 2007. *Environmental Science & Technology*, 41(7): 2579-2586 and Mohn, J., Szidat, S., Fellner, J., Rechberger, H., Quartier, R., Buchmann, B. and Emmenegger, L., *Determination of biogenic and fossil CO₂ emitted by waste incineration based on ¹⁴CO₂ and mass balances*. 2008. *Bioresource Technology*, 99: 6471-6479).

¹¹ U.S. Environmental Protection Agency. Municipal Solid Waste, Electricity from Municipal Solid Waste. <http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html>. EIA form 923 generation information for 2010 and EPA NEI data for 2008 eGRIDweb Version 1.0 Plant File (Year 2005 Data) for Arizona Facilities <http://www.srpnet.com/environment/sustainability/RenewableTechnologies.aspx>

As stated previously, carbon dioxide emissions from biogenic sources are considered “recycled” or carbon-neutral because the sources of the emissions, prior to being used as fuel, were absorbing CO₂ from the atmosphere.¹² In biomass facilities, all of the CO₂ emissions are carbon-neutral because all of the fuel is renewable. In a WTE facility, where the fuel is a mixture of biogenic and non-biogenic sources, there will be carbon-neutral CO₂ emissions from the biogenic sources and fossil fuel based CO₂ emissions from the non-biogenic sources.

Although the fuel source for landfill gas-to-energy facilities is derived from the breakdown of biogenic materials in the landfill, the methane leakage from landfills accounts for significant emissions of CO₂ equivalent (“CO₂e”). Current estimates show that one ton of MSW combusted rather than landfilled reduces greenhouse gas emissions by an average of one ton of CO₂.¹³

Water Impacts

Power plants that burn MSW are normally smaller than fossil fuel power plants and typically require a similar amount of water per unit of electricity generated.¹⁴ Water consumption by power plants varies by plant type and cooling technology with coal, biomass, and natural gas facilities consuming between approximately 100 and 500 gallons per MWh.¹⁵

Land Impacts

WTE facilities, much like other power plants, require land for equipment and fuel storage.

The non-hazardous ash residue from the burning of MSW is typically deposited in landfills.¹⁶ Regular testing ensures that residual ash is non-hazardous before being landfilled. About ten percent of the total ash formed in the combustion process is used for beneficial use such as daily cover in landfills and road construction.¹⁷ Less MSW being sent to the landfill leads to reduced land impacts associated with landfill sites – WTE plants reduce the space required for landfilling by about 90 percent (one square foot per ton of MSW). WTE plants also do not have the aqueous emissions, or leachate, that may be experienced in landfills, either now

¹² Institute of Clean Air Companies. Inside the APC Industry, Regulatory Implications of ASTM-D6866. September 2007, Volume 1 Issue 1. p. 4. <http://www.betalabservices.com/PDF/ICAC.pdf>

¹³ P.O. Kaplan, Joseph Decarolis and Susan Thornloe. Is it Better to Burn or Bury Waste for Clean Electricity Generation? *Environ. Sci. Technol.* 2009, Volume 43, No. 6, pp. 1711–1717. See also Waste-to-Energy Research and Technology Council, Answers to FAQ. <http://www.seas.columbia.edu/earth/wtert/faq.html>

¹⁴ U.S. Environmental Protection Agency. Municipal Solid Waste, Electricity from Municipal Solid Waste. <http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html>

¹⁵ Water & Sustainability (Volume 3): U.S. Water Consumption for Power Production—The Next Half Century, EPRI, Palo Alto, CA: 2002. 1006786.

¹⁶ U.S. Environmental Protection Agency. Municipal Solid Waste, Electricity from Municipal Solid Waste. <http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html>

¹⁷ U.S. Environmental Protection Agency. Municipal Solid Waste, Combustion. <http://www.epa.gov/epawaste/nonhaz/municipal/combustion.htm>

or in the distant future.¹⁸ Moreover, burning waste at extremely high temperatures also destroys chemical compounds and disease-causing bacteria.¹⁹

Improved Recycling Rates

MSW combustion processes using refuse-derived fuel can also be equipped to recover recyclables, thereby increasing recycling rates, before shredding the combustible fraction to uniform size for incineration.²⁰ Additionally, WTE plants recover more than 700,000 tons of ferrous metals for recycling annually. Recycling metals saves energy and CO₂ emissions that would have been emitted if the materials were mined and new metals, such as steel, were manufactured.²¹

Renewable Energy Standard and Tariff

The Renewable Energy Standard and Tariff ("REST") Rules are codified at Title 14, Chapter 2, Article 18 of the Arizona Administrative Code.²² The REST Rules detail the Annual Renewable Energy Requirement²³ that each Affected Utility²⁴ must satisfy and also prescribes the Eligible Renewable Energy Resources²⁵ that may be used to meet the Annual Renewable Energy Requirement.

MEC, as a public service corporation serving retail electric load in Arizona, is an Affected Utility under the REST Rules and, as such, must comply with the Annual Renewable Energy Requirement. MEC wishes to use the energy from the proposed WTE facility to meet part of that Requirement. Municipal solid waste-to-energy facilities, however, are not an Eligible Renewable Energy Resource under A.A.C. R14-2-1802(A).

¹⁸ Waste-to-Energy Research and Technology Council, Answers to FAQ.
<http://www.seas.columbia.edu/earth/wtert/faq.html>; Cornell Waste Management Institute, Trash Goes to School. "Leachate is produced when water filters downward through a landfill, picking up dissolved materials from the decomposing wastes. Depending on characteristics of the landfill and the wastes it contains, the leachate may be relatively harmless or extremely toxic. Generally leachate has a high biochemical oxygen demand (BOD) and high concentrations of organic carbon, nitrogen, chloride, iron, manganese, and phenols. Many other chemicals may be present, including pesticides, solvents, and heavy metals." Modern sanitary landfills, however, are constructed to prevent leachate contamination of groundwater or surface waters.
<http://cwmi.css.cornell.edu/TrashGoesToSchool/Landfill.html>

¹⁹ U.S. Environmental Protection Agency. Municipal Solid Waste, Combustion.
<http://www.epa.gov/epawaste/nonhaz/municipal/combustion.htm>

²⁰ U.S. Environmental Protection Agency. Municipal Solid Waste, Combustion.
<http://www.epa.gov/epawaste/nonhaz/municipal/combustion.htm>

²¹ Ted Michaels. Waste Not, Want Not: The Facts Behind Waste-to-Energy. April 2009.

²² See A.A.C. R14-2-1801, *et seq.*

²³ See A.A.C. R14-2-1804.

²⁴ See A.A.C. R14-2-1801(A): ("Affected Utility" means a public service corporation serving retail electric load in Arizona, but excluding any Utility Distribution Company with more than half of its customers located outside of Arizona.").

²⁵ See A.A.C. R14-2-1802(A).

Pilot Program

MEC requests that the Commission recognize energy produced at the proposed WTE facility as a pilot program pursuant to A.A.C. R14-2-1802(D) which states:

The Commission may adopt pilot programs in which additional technologies are established as Eligible Renewable Energy Resources. Any such additional technologies shall be Renewable Energy Resources that produce electricity, replace electricity generated by Conventional Energy Resources, or replace the use of fossil fuels with Renewable Energy Resources. Energy conservation products, energy management products, energy efficiency products, or products that use non-renewable fuels shall not be eligible for these pilot programs.

Staff does not recommend that the Commission adopt the proposed RPG facility as a pilot program.

Under A.A.C. R14-2-1802(D), a Renewable Energy Resource must be utilized with the pilot technology. As stated previously, MEC provided Staff with a breakdown, by category, of an MSW sample from the City of Glendale Materials Recovery Facility which is assumed to be typical of MSW in the Phoenix Metropolitan area. Because only approximately 82-95 percent of the waste stream can be identified as biogenic, Staff is concerned that typical MSW in the Phoenix Metropolitan area, as a whole, might not constitute a "Renewable Energy Resource" within the meaning of A.A.C. R14-2-1801(O). As such, Staff does not believe it is appropriate at this time to establish WTE as an Eligible Renewable Energy Resource as a pilot program pursuant to A.A.C. R14-2-1802(D).

Waiver of the REST Rules

In the alternative, MEC requests that the Commission grant a waiver to the REST Rules, pursuant to A.A.C. R14-2-1816(A), to the limited extent necessary to recognize energy produced at the RPG WTE facility as an Eligible Renewable Energy Resource as defined by A.A.C. R14-2-1802(A) and as otherwise qualifying as Renewable Energy Credits ("RECs") under A.A.C. R14-2-1803 and eligible to satisfy the Annual Renewable Energy Requirement established by A.A.C. R14-2-1804.

Staff believes that good cause exists for the Commission to grant a waiver of the REST Rules, pursuant to A.A.C. R14-2-1816(A),²⁶ to the limited extent necessary to recognize energy produced at the RPG WTE facility as an Eligible Renewable Energy Resource on an experimental basis. WTE technology has never been pursued in Arizona. While there appear to be many potential benefits associated with the use of this technology, there are also some potential consequences, as previously discussed. At this point in time, with the data presently

²⁶ See A.A.C. R14-2-1816(A) ("The Commission may waive compliance with any provision of this Article for good cause.").

available, Staff believes that the potential benefits outweigh the potential consequences, especially when compared to the alternative of landfilling MSW.

Although MSW, as a whole, may not constitute a Renewable Energy Resource as that term is defined in A.A.C. R14-2-1801(O),²⁷ 82-95 percent of the waste to be used in the proposed WTE facility can be identified as biogenic, with that biogenic portion accounting for 91 percent of the energy produced.²⁸ However, ASTM-D6866 and balance method data have shown that 60-75 percent of the CO₂ emissions from WTE stacks in the United States are recycled CO₂, or produced from biogenic sources.²⁹

It is difficult to fully assess how much of the MSW in the Phoenix Metropolitan area, and the energy it could produce, may be deemed “renewable” based on the biogenic content of the small sample provided by MEC. Although MSW is substantially similar nationwide, Staff is also hesitant to rely on national averages to determine the renewable content of Phoenix’s MSW.

Given the nature of this resource and the information currently available, Staff recommends that 1 Renewable Energy Credit (“REC”) be created for each kilowatt-hour (“kWh”) of energy generated from biogenic material with that energy considered as being produced by an Eligible Renewable Energy Resource. Based on local data representing that 91 percent of the energy would come from biogenic sources, after recycling, and general national information indicating that 60-75 percent of WTE facility energy is generated from biogenic sources, Staff recommends that, at this time, 75 percent of the kWhs generated by the proposed RPG WTE facility be deemed biogenic and produced by an Eligible Renewable Energy Resource. In other words, if this facility produced a **total** of 1,000,000 kWh in a year, it will be considered to have produced 750,000 RECs.

Reporting

The U.S. EPA has recently established mandatory reporting requirements for greenhouse gas emissions (“GHGs”).³⁰ In general, the Mandatory Reporting of Greenhouse Gases Rule

²⁷ See A.A.C. R14-2-1801(O) (“‘Renewable Energy Resource’ means an energy resource that is replaced rapidly by a natural, ongoing process and that is not nuclear or fossil fuel.”).

²⁸ See A.A.C. R14-2-1802(A)(2) (“Biomass Electricity Generator”).

²⁹ Personal communication between Laura Furrey and a Beta Lab Services technician, April 6, 2011 (stating that, on average, samples from U.S. WTE facilities, which are submitted on a quarterly basis, contain between 60 – 75 percent recycled CO₂, although there are outliers on both ends of that range); Inside the APC Industry, Regulatory Implications of ASTM-D6866. September 2007, Volume 1 Issue 1. p. 5. (suggesting a recycled CO₂ value of 60 – 75 percent). <http://www.betalabservices.com/PDF/ICAC.pdf>; Helmut Rechberger, Determination of the biogenic fraction in waste, presented at WtERT Annual Meeting in Europe, October 12-14, 2010 (suggesting a biogenic ratio of between 40 and 70 percent). Available at http://www.admas.vutbr.cz/files/wtert-prezentace/Rechberger_-_Determination_of_biogenic_fraction_of_the_waste.pdf; Institute of Clean Air Companies.

³⁰ U.S. Environmental Protection Agency. Mandatory Reporting of Greenhouse Gases Rule. 74 FR 5620, 40 CFR Part 98. September 22, 2009; U.S. Environmental Protection Agency. Climate Change – Regulatory Initiatives, Greenhouse Gas Reporting Program. <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>

applies to facilities that directly emit GHGs, including Electricity Generating Facilities, that emit 25,000 metric tons of CO₂e or more per calendar year beginning in 2010.³¹ According to the EPA “[t]he purpose of the rule is to collect accurate and timely GHG data to inform future policy decisions.”³² EPA requires that WTE facilities where MSW, as either the primary fuel or the only fuel with a biogenic component, is combusted in a unit, the biogenic portion of the CO₂ emissions be determined using the ASTM-D6866 analysis.³³

While it is not likely that the RPG WTE facility will emit enough CO₂e per year to require compliance with the EPA’s rule, Staff recommends that the RPG WTE facility use the most current version of the ASTM-D6866 analysis method, as specified in 40 CFR §98.34(d), to collect information on the biogenic portion of its CO₂ emissions on a semi-annual basis, similar to what would be required if the RPG WTE facility were to comply with the EPA’s rule. Staff recommends that MEC include the information in a report filed with the Commission on a semi-annual basis until further order of the Commission, but for no less than two years.

Reporting of this information will provide the Commission with accurate and timely information about the use of WTE technology in Arizona and the extent to which Phoenix’s MSW may be classified as renewable for purposes of generating renewable energy in the proposed WTE facility. If MEC determines, based on the results of the ASTM-D6866 analysis, that the biogenic portion of the energy produced from Phoenix’s MSW is consistently greater than 75 percent, MEC may apply to the Commission to increase the allowable percentage of kWhs of energy derived from the RPG WTE facility to be considered as being produced by an Eligible Renewable Energy Resource, commensurate with the renewable, or biogenic, content of the energy produced at the facility.

In addition, Staff recommends that RPG also monitor the waste stream entering the WTE facility to determine the categorical composition breakdown of MSW samples, similar to that previously provided to Staff. MEC should provide the Commission with such reports on a semi-annual basis until further order of the Commission, but for no less than two years. The reports should include the following information: composition by MSW categories, measured weight, percent by weight, and recycling rates.

³¹ U.S. Environmental Protection Agency. Greenhouse Gas Reporting Rule (40 CFR part 98) Training. <http://www.epa.gov/reg3artd/globclimate/Part-98-Training-Complete.pdf>

³² U.S. Environmental Protection Agency. Climate Change – Regulatory Initiatives, Greenhouse Gas Reporting Program. <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>

³³ See Mandatory Greenhouse Gas Reporting, Monitoring and QA/QC requirements, 40 CFR §98.34(d)(requiring use of ASTM Standard D7459 sampling and ASTM Standard D6866 analysis of MSW samples). See also ASTM Standard D6866-10, 2010, “Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis”; ASTM Standard D7459-08, 2008, “Standard Practice for Collection of Integrated Samples for the Speciation of Biomass (Biogenic) and Fossil-Derived Carbon Dioxide Emitted from Stationary Emissions Sources” <http://www.astm.org>

Recommendations

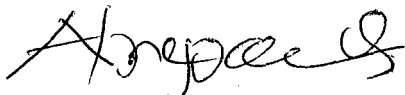
Staff recommends that the Commission grant a waiver of A.A.C. R14-2-1802(A) to the limited extent necessary to recognize the RPG WTE facility as an "Eligible Renewable Energy Resource" on an experimental basis such that energy produced at the facility may count for "Renewable Energy Credits" under A.A.C. R14-2-1803 and be eligible to satisfy the annual renewable energy requirements established by A.A.C. R14-2-1804.

Staff further recommends that, at this time, 75 percent of the total kWhs of energy derived from the RPG WTE facility be considered as being produced by an Eligible Renewable Energy Resource.

Staff recommends that MEC file MSW categorical composition breakdowns and copies of ASTM-D6866 analyses with the Commission on a semi-annual basis until further order of the Commission, but for no less than two years of operation of the RPG WTE facility.

Staff also recommends that, in cooperation with Maricopa County and the Arizona Department of Environmental Quality, MEC be required to develop an offsite air quality monitoring program to measure the air quality impacts of this WTE facility. This plan shall be submitted to the Commission (through Docket Control) prior to the WTE facility beginning operation. The air quality monitoring results shall be submitted to the Commission as part of the above described semi-annual reports.

Staff's recommendations in this matter do not address the prudence of any purchased power agreement that MEC may enter into with RPG.

for 
Steven M. Olea
Director
Utilities Division

SMO:LAF:SMH\sms

ORIGINATOR: Laura A. Furrey

1 **BEFORE THE ARIZONA CORPORATION COMMISSION**

2 GARY PIERCE
 Chairman

3 BOB STUMP
 Commissioner

4 SANDRA D. KENNEDY
 Commissioner

5 PAUL NEWMAN
 Commissioner

6 BRENDA BURNS
 Commissioner

7
8 IN THE MATTER OF MOHAVE ELECTRIC)
9 COOPERATIVE, INC.'S APPLICATION)
10 FOR APPROVAL OF A WASTE-TO-
11 ENERGY FACILITY AS A PILOT
12 PROGRAM UNDER THE RENEWABLE
13 ENERGY RULES OR, IN THE
14 ALTERNATIVE, FOR A LIMITED
15 WAIVER

DOCKET NO. E-01750A-10-0453

DECISION NO. _____

ORDER

15 Open Meeting
16 May 24 and 25, 2011
17 Phoenix, Arizona

17 BY THE COMMISSION:

18 FINDINGS OF FACT

19 1. Mohave Electric Cooperative, Inc. ("MEC" or "the Cooperative") is certificated to
20 provide electric service as a public service corporation in the State of Arizona.

21 Introduction

22 2. On November 5, 2010, MEC filed its Application for Approval of a Waste-to-
23 Energy Facility as a Pilot Program under the REST Rules or, in the Alternative, for a Limited
24 Waiver ("Application").

25 3. In its Application, MEC is requesting that the Arizona Corporation Commission
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3 A.A.C. R14-2-1802. Under either scenario, MEC is seeking to have the facility qualify for
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5 renewable energy requirements established by A.A.C. R14-2-1804.

6 4. RPG is an Arizona limited liability company, formed in 2008, that is currently in
7 good standing with the State of Arizona. The facility developed by RPG would use steam
8 produced from the direct combustion of residential municipal solid waste ("MSW") to run a
9 turbine and electric generator. The anticipated facility would receive approximately 500 tons per
10 day of MSW, 25 percent of which may be recycled. The City of Phoenix and surrounding areas
11 generate in excess of 10,000 tons of MSW per day. Although the proposed facility would provide
12 residents in MEC's territory with power, the location of the planned facility would be in the
13 Phoenix Metropolitan area. However, an actual site for the facility has yet to be determined.

14 5. The net output of the planned facility would be 11 megawatts ("MW"). WTE
15 facilities provide baseload power. This facility could potentially supply MEC's customers with
16 more than 86,000 megawatt-hours ("MWh") of energy on an annual basis (assuming a 90 percent
17 capacity factor). RPG has indicated that the facility would support approximately 40 direct jobs
18 and a number of indirect jobs related to contract services, such as housekeeping, legal, and ash
19 disposal.

20 Waste-to-Energy

21 6. In the United States, there are currently 87 WTE facilities operating in 24 states,
22 generating approximately 2,500 MW, or about 0.3 percent of total national power generation.¹

23 *MSW as a Renewable Resource*

24 7. Treatment of MSW as a renewable resource varies at both the state and federal
25 level. Some state renewable portfolio standards include all or part of MSW-fueled generation as
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28 ¹ U.S. Environmental Protection Agency. Municipal Solid Waste, Electricity from Municipal Solid Waste.
<http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html>

1 renewable while others exclude MSW entirely.² At the federal level, the treatment of MSW as a
2 form of renewable energy varies across programs, laws and even within sections of the same body
3 of law.³

4 8. The Energy Information Administration ("EIA") recently examined how it
5 classifies MSW as a renewable resource and found that it had sufficient information to separate the
6 energy produced from MSW into biogenic and non-biogenic portions.⁴ EIA included the
7 following items as biogenic material: newsprint, paper, containers and packaging, textiles, yard
8 trimmings, food wastes, wood, and leather. The EIA identified non-biogenic material to include
9 plastics and rubber.

10 9. In 2008, the most recent year for which data is available, biogenic MSW accounted
11 for almost 6 percent of the renewable energy consumed in the United States.⁵

12 10. MEC provided Staff with a breakdown, by category, of an MSW sample from the
13 City of Glendale Materials Recovery Facility as an example of the MSW that could be used as fuel
14 for the proposed RPG facility. Prior to recycling, the MSW, assumed to be typical of that in the
15 Phoenix Metropolitan area, is composed of about 82 percent biogenic material, 12 percent non-
16 biogenic material, and 6 percent non-combustible material, such as glass and metal. After taking
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18 ² For example, Connecticut (Conn. Gen. Stat. §16-245a et seq.), the District of Columbia (D.C. Code § 34-1431 et
19 seq.), Maryland (Md. Public Utility Companies Code § 7-701 et seq.), Massachusetts (M.G.L. ch. 25A, § 11F),
20 New Jersey (N.J. Stat. § 48:3-49 et seq.), and Pennsylvania (73 P.S. § 1648.1 et seq.) allow energy from MSW to
21 be partially counted toward compliance with a renewable portfolio standard. Hawaii (HRS § 269-91 et seq.),
22 Iowa (Iowa Code § 476.41 et seq.), Maine (35-A M.R.S. § 3210), Michigan (MCL § 460.1021 et seq.), Minnesota
(Minn. Stat. § 216B.1691), Nevada (NRS 704.7801 et seq.), Utah (Utah Code 54-17-101 et seq.) allow for energy
from MSW to count completely toward RPS compliance. Delaware (26 Del. C. § 351 et seq.), Illinois (§ 20 ILCS
3855/1-75), Texas (Texas Utilities Code § 39.904), Vermont (30 V.S.A. § 8001 et seq.) and Washington (WAC
194-37) specifically prohibit the use of MSW for purposes of generating renewable energy.

23 ³ Energy Information Administration. Methodology for Allocating Municipal Solid Waste to Biogenic and Non-
24 Biogenic Energy. May 2007. "For example, the definition of renewable energy in Section 203 of the Energy
25 Policy Act of 2005 explicitly includes MSW-derived electricity as a "renewable energy" resource eligible to
satisfy the federal renewable energy purchase requirement established in that section. Yet, many other sections of
the same bill do not include MSW as an eligible renewable energy source for purposes of programs that aim to
develop, assess, or support renewable energy."

http://www.eia.doe.gov/cneaf/solar.renewables/page/mswaste/msw_report.html

26 ⁴ Although it is not meant as a definitive source for the treatment of MSW, the EIA issued a "Methodology for
27 Allocating Municipal Solid Waste to Biogenic/Non-Biogenic Energy" detailing the methodology it used to
distinguish between biogenic and non-biogenic energy in MSW.

http://www.eia.doe.gov/cneaf/solar.renewables/page/mswaste/msw_report.html

28 ⁵ Energy Information Administration. Renewable Energy Annual, Table 1.1 U.S. Energy Consumption by Source.
Available at http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/table1_1.xls

1 recycling rates into account, the biogenic material accounts for about 95 percent of the waste
2 stream, with non-biogenic and non-combustible materials accounting for only approximately 2
3 percent and 3 percent of the waste stream, respectively.

4 11. Although the biogenic material may count for approximately 95 percent of the
5 MSW stream after recycling, the biogenic material does not contribute 95 percent of the energy to
6 the system to produce electricity. The remaining components of the MSW burn at various heat
7 rates. Using heat rate factors from the EIA, the biogenic material contributes about 91 percent of
8 the energy to the process while non-biogenic materials contribute about 9 percent of the energy to
9 the process with the non-combustibles contributing nothing (glass and metal do not burn to
10 produce energy).

11 12. Until recently, calculation of energy from renewable content was accounted for by
12 gross estimation of combustion fuel sources, similar to the description of the MSW composition
13 discussed above. Recently, however, another method was developed out of the U.S. Department
14 of Agriculture's BioPreferred program. This program prefers manufacturers of products derived
15 from renewable resources.⁶

16 13. ASTM-D6866 is a standardized method of identifying the carbon-14 isotope
17 ("C14") and providing a value of renewable carbon content within any solid, liquid or gas.⁷ The
18 test methods are applicable to any product containing carbon-based components that can be
19 combusted in the presence of oxygen to produce carbon dioxide ("CO₂") gas.⁸ The overall
20 analytical method is also applicable to gaseous samples, including flue gases from electrical utility
21 boilers and waste incinerators.

22 14. Recycled CO₂, also known as carbon-neutral CO₂, is carbon dioxide which was
23 removed from the air through plant respiration, then returned to the air through combustion of
24 plant derivatives. Common fuels which produce recycled CO₂ include biomass, ethanol and
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26 ⁶ ASTM Standard D6866-10, 2010, "Standard Test Methods for Determining the Biobased Content of Solid,
Liquid, and Gaseous Samples Using Radiocarbon Analysis," www.astm.org.

27 ⁷ Institute of Clean Air Companies. Inside the APC Industry, Regulatory Implications of ASTM-D6866. September
2007, Volume 1 Issue 1. p. 4. <http://www.betalabservices.com/PDF/ICAC.pdf>

28 ⁸ ASTM International, ASTM D6866 - 10 Standard Test Methods for Determining the Biobased Content of Solid,
Liquid, and Gaseous Samples Using Radiocarbon Analysis. <http://www.astm.org/Standards/D6866.htm>

1 municipal solid waste. The carbon-14 isotope is present in all plant material and is absent in all
2 fossil fuels.⁹ By measuring the presence of C14 in the air and in emissions from combustion
3 activities directly, the ratio of recycled CO₂ to fossil fuel-based CO₂ can be determined. The basic
4 difference between renewable-based products and petroleum-based products is the presence of
5 modern or ancient origin of the carbon in those products. As such, radiocarbon dating is able to
6 distinguish between the two sources.

7 15. The balance method is also currently used to determine the biogenic portion of
8 mixed waste. The balance method uses existing data on the composition of materials and the
9 operating conditions of the WTE plant, and calculates the most probable result based on a
10 mathematical-statistical model. Comparisons between the C14 method and the balance method
11 conducted at three full-scale facilities in Switzerland show that both methods arrive at the same
12 result.¹⁰

13 *Environmental Impacts*

14 16. In general, the resultant emissions from most thermal power plants will range from
15 most dirty in the case of coal as fuel, to least dirty in the case of natural gas as fuel, with MSW as
16 fuel lying somewhere between the two. All waste-to-energy facilities must comply with the U.S.
17 Environmental Protection Agency's ("EPA") Maximum Achievable Control Technology
18 ("MACT") standards. While MSW may be cleaner than coal, it is not necessarily cleaner than
19 natural gas or other renewable resources, such as wind and solar.

20 17. For example, SO₂ emissions from a WTE facility are generally less than those from
21 coal-fired facilities, greater than those from natural gas facilities, and on par with those from
22 biomass and landfill gas-to-energy facilities. NO_x emissions from a WTE facility are generally

24 ⁹ When plants fix atmospheric CO₂ into organic material during photosynthesis they incorporate a quantity of C14
25 that approximately matches the level of this isotope in the atmosphere. After plants die or they are consumed by
26 other organisms, the C14 fraction of this organic material declines at a fixed exponential rate due to the
radioactive decay of C14.

26 ¹⁰ Wikipedia, Waste-to-energy. <http://en.wikipedia.org/wiki/Waste-to-energy> (citing Fellner, J., Cencic, O. and
27 Rechberger, H., *A New Method to Determine the Ratio of Electricity Production from Fossil and Biogenic
Sources in Waste-to-Energy Plants*. 2007. *Environmental Science & Technology*, 41(7): 2579-2586 and Mohn, J.,
28 Szidat, S., Fellner, J., Rechberger, H., Quartier, R., Buchmann, B. and Emmenegger, L., *Determination of
biogenic and fossil CO₂ emitted by waste incineration based on ¹⁴CO₂ and mass balances*. 2008. *Bioresource
Technology*, 99: 6471-6479).

1 less than those from coal-fired, landfill gas-to-energy, or biomass facilities but greater than those
2 from natural gas facilities. PM₁₀ emissions from a WTE facility are generally less than those from
3 coal-fired and landfill gas-to-energy facilities but greater than those from natural gas facilities.
4 CO₂ emissions from a WTE facility tend to be less than those from coal-fired and landfill gas-to-
5 energy facilities but greater than those from natural gas and biomass facilities.¹¹

6 18. As stated previously, carbon dioxide emissions from biogenic sources are
7 considered “recycled” or carbon-neutral because the sources of the emissions, prior to being used
8 as fuel, were absorbing CO₂ from the atmosphere.¹² In biomass facilities, all of the CO₂ emissions
9 are carbon-neutral because all of the fuel is renewable. In a WTE facility, where the fuel is a
10 mixture of biogenic and non-biogenic sources, there will be carbon-neutral CO₂ emissions from
11 the biogenic sources and fossil fuel based CO₂ emissions from the non-biogenic sources.

12 19. Although the fuel source for landfill gas-to-energy facilities is derived from the
13 breakdown of biogenic materials in the landfill, the methane leakage from landfills accounts for
14 significant emissions of CO₂ equivalent (“CO₂e”). Current estimates show that one ton of MSW
15 combusted rather than landfilled reduces greenhouse gas emissions by an average of one ton of
16 CO₂.¹³

17 *Water Impacts*

18 20. Power plants that burn MSW are normally smaller than fossil fuel power plants and
19 typically require a similar amount of water per unit of electricity generated.¹⁴ Water

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24 ¹¹ U.S. Environmental Protection Agency. Municipal Solid Waste, Electricity from Municipal Solid Waste.
<http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html>. EIA form 923 generation information
25 for 2010 and EPA NEI data for 2008 eGRIDweb Version 1.0 Plant File (Year 2005 Data) for Arizona Facilities
<http://www.srpnet.com/environment/sustainability/RenewableTechnologies.aspx>

26 ¹² Institute of Clean Air Companies. Inside the APC Industry, Regulatory Implications of ASTM-D6866. September
2007, Volume 1 Issue 1. p. 4. <http://www.betalabservices.com/PDF/ICAC.pdf>

27 ¹³ P.O. Kaplan, Joseph Decarolis and Susan Thornloe. Is it Better to Burn or Bury Waste for Clean Electricity
28 Generation? *Environ. Sci. Technol.* 2009, Volume 43, No. 6, pp. 1711–1717. See also Waste-to-Energy Research
and Technology Council, Answers to FAQ. <http://www.seas.columbia.edu/earth/wtert/faq.html>

¹⁴ U.S. Environmental Protection Agency. Municipal Solid Waste, Electricity from Municipal Solid Waste.
<http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html>

consumption by power plants varies by plant type and cooling technology with coal, biomass, and natural gas facilities consuming between approximately 100 and 500 gallons per MWh.¹⁵

Land Impacts

21. WTE facilities, much like other power plants, require land for equipment and fuel storage.

22. The non-hazardous ash residue from the burning of MSW is typically deposited in landfills.¹⁶ Regular testing ensures that residual ash is non-hazardous before being landfilled. About ten percent of the total ash formed in the combustion process is used for beneficial use such as daily cover in landfills and road construction.¹⁷ Less MSW being sent to the landfill leads to reduced land impacts associated with landfill sites – WTE plants reduce the space required for landfilling by about 90 percent (one square foot per ton of MSW). WTE plants also do not have the aqueous emissions, or leachate, that may be experienced in landfills, either now or in the distant future.¹⁸ Moreover, burning waste at extremely high temperatures also destroys chemical compounds and disease-causing bacteria.¹⁹

Improved Recycling Rates

23. MSW combustion processes using refuse-derived fuel can also be equipped to recover recyclables, thereby increasing recycling rates, before shredding the combustible fraction

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¹⁵ Water & Sustainability (Volume 3): U.S. Water Consumption for Power Production—The Next Half Century, EPRI, Palo Alto, CA: 2002. 1006786.

¹⁶ U.S. Environmental Protection Agency. Municipal Solid Waste, Electricity from Municipal Solid Waste. <http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html>

¹⁷ U.S. Environmental Protection Agency. Municipal Solid Waste, Combustion. <http://www.epa.gov/epawaste/nonhaz/municipal/combustion.htm>

¹⁸ Waste-to-Energy Research and Technology Council, Answers to FAQ. <http://www.seas.columbia.edu/earth/wtert/faq.html>; Cornell Waste Management Institute, Trash Goes to School. "Leachate is produced when water filters downward through a landfill, picking up dissolved materials from the decomposing wastes. Depending on characteristics of the landfill and the wastes it contains, the leachate may be relatively harmless or extremely toxic. Generally leachate has a high biochemical oxygen demand (BOD) and high concentrations of organic carbon, nitrogen, chloride, iron, manganese, and phenols. Many other chemicals may be present, including pesticides, solvents, and heavy metals." Modern sanitary landfills, however, are constructed to prevent leachate contamination of groundwater or surface waters. <http://cwmi.css.cornell.edu/TrashGoesToSchool/Landfill.html>

¹⁹ U.S. Environmental Protection Agency. Municipal Solid Waste, Combustion. <http://www.epa.gov/epawaste/nonhaz/municipal/combustion.htm>

1 to uniform size for incineration.²⁰ Additionally, WTE plants recover more than 700,000 tons of
2 ferrous metals for recycling annually. Recycling metals saves energy and CO₂ emissions that
3 would have been emitted if the materials were mined and new metals, such as steel, were
4 manufactured.²¹

5 **Renewable Energy Standard and Tariff**

6 24. The Renewable Energy Standard and Tariff ("REST") Rules are codified at Title
7 14, Chapter 2, Article 18 of the Arizona Administrative Code.²² The REST Rules detail the
8 Annual Renewable Energy Requirement²³ that each Affected Utility²⁴ must satisfy and also
9 prescribes the Eligible Renewable Energy Resources²⁵ that may be used to meet the Annual
10 Renewable Energy Requirement.

11 25. MEC, as a public service corporation serving retail electric load in Arizona, is an
12 Affected Utility under the REST Rules and, as such, must comply with the Annual Renewable
13 Energy Requirement. MEC wishes to use the energy from the proposed WTE facility to meet part
14 of that Requirement. Municipal solid waste-to-energy facilities, however, are not an Eligible
15 Renewable Energy Resource under A.A.C. R14-2-1802(A).

16 *Pilot Program*

17 26. MEC requests that the Commission recognize energy produced at the proposed
18 WTE facility as a pilot program pursuant to A.A.C. R14-2-1802(D) which states:

19 The Commission may adopt pilot programs in which additional technologies are
20 established as Eligible Renewable Energy Resources. Any such additional
21 technologies shall be Renewable Energy Resources that produce electricity,
22 replace electricity generated by Conventional Energy Resources, or replace the
23 use of fossil fuels with Renewable Energy Resources. Energy conservation
24 products, energy management products, energy efficiency products, or products
25 that use non-renewable fuels shall not be eligible for these pilot programs.

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25 ²⁰ U.S. Environmental Protection Agency. Municipal Solid Waste, Combustion.
<http://www.epa.gov/epawaste/nonhaz/municipal/combustion.htm>

26 ²¹ Ted Michaels. Waste Not, Want Not: The Facts Behind Waste-to-Energy. April 2009.

27 ²² See A.A.C. R14-2-1801, *et seq.*

28 ²³ See A.A.C. R14-2-1804.

²⁴ See A.A.C. R14-2-1801(A): ("Affected Utility" means a public service corporation serving retail electric load in Arizona, but excluding any Utility Distribution Company with more than half of its customers located outside of Arizona.").

²⁵ See A.A.C. R14-2-1802(A).

1 27. Staff does not recommend that the Commission adopt the proposed RPG facility as
2 a pilot program.

3 28. Under A.A.C. R14-2-1802(D), a Renewable Energy Resource must be utilized with
4 the pilot technology. As stated previously, MEC provided Staff with a breakdown, by category, of
5 an MSW sample from the City of Glendale Materials Recovery Facility which is assumed to be
6 typical of MSW in the Phoenix Metropolitan area. Because only approximately 82-95 percent of
7 the waste stream can be identified as biogenic, Staff is concerned that typical MSW in the Phoenix
8 Metropolitan area, as a whole, might not constitute a "Renewable Energy Resource" within the
9 meaning of A.A.C. R14-2-1801(O). As such, Staff does not believe it is appropriate at this time to
10 establish WTE as an Eligible Renewable Energy Resource as a pilot program pursuant to A.A.C.
11 R14-2-1802(D).

12 *Waiver of the REST Rules*

13 29. In the alternative, MEC requests that the Commission grant a waiver to the REST
14 Rules, pursuant to A.A.C. R14-2-1816(A), to the limited extent necessary to recognize energy
15 produced at the RPG WTE facility as an Eligible Renewable Energy Resource as defined by
16 A.A.C. R14-2-1802(A) and as otherwise qualifying as Renewable Energy Credits ("RECs") under
17 A.A.C. R14-2-1803 and eligible to satisfy the Annual Renewable Energy Requirement established
18 by A.A.C. R14-2-1804.

19 30. Staff believes that good cause exists for the Commission to grant a waiver of the
20 REST Rules, pursuant to A.A.C. R14-2-1816(A),²⁶ to the limited extent necessary to recognize
21 energy produced at the RPG WTE facility as an Eligible Renewable Energy Resource on an
22 experimental basis. WTE technology has never been pursued in Arizona. While there appear to be
23 many potential benefits associated with the use of this technology, there are also some potential
24 consequences, as previously discussed. At this point in time, with the data presently available,
25 Staff believes that the potential benefits outweigh the potential consequences, especially when
26 compared to the alternative of landfilling MSW.

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28 ²⁶ See A.A.C. R14-2-1816(A) ("The Commission may waive compliance with any provision of this Article for good cause.").

31. Although MSW, as a whole, may not constitute a Renewable Energy Resource as that term is defined in A.A.C. R14-2-1801(O),²⁷ 82-95 percent of the waste to be used in the proposed WTE facility can be identified as biogenic, with that biogenic portion accounting for 91 percent of the energy produced.²⁸ However, ASTM-D6866 and balance method data have shown that 60-75 percent of the CO₂ emissions from WTE stacks in the United States are recycled CO₂, or produced from biogenic sources.²⁹

32. It is difficult to fully assess how much of the MSW in the Phoenix Metropolitan area, and the energy it could produce, may be deemed “renewable” based on the biogenic content of the small sample provided by MEC. Although MSW is substantially similar nationwide, Staff is also hesitant to rely on national averages to determine the renewable content of Phoenix’s MSW.

33. Given the nature of this resource and the information currently available, Staff recommends that 1 Renewable Energy Credit (“REC”) be created for each kilowatt-hour (“kWh”) of energy generated from biogenic material with that energy considered as being produced by an Eligible Renewable Energy Resource. Based on local data representing that 91 percent of the energy would come from biogenic sources, after recycling, and general national information indicating that 60-75 percent of WTE facility energy is generated from biogenic sources, Staff recommends that, at this time, 75 percent of the kWhs generated by the proposed RPG WTE facility be deemed biogenic and produced by an Eligible Renewable Energy Resource. In other words, if this facility produced a **total** of 1,000,000 kWh in a year, it will be considered to have produced 750,000 RECs.

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²⁷ See A.A.C. R14-2-1801(O) (“‘Renewable Energy Resource’ means an energy resource that is replaced rapidly by a natural, ongoing process and that is not nuclear or fossil fuel.”).

²⁸ See A.A.C. R14-2-1802(A)(2) (“Biomass Electricity Generator”).

²⁹ Personal communication between Laura Furrey and a Beta Lab Services technician, April 6, 2011 (stating that, on average, samples from U.S. WTE facilities, which are submitted on a quarterly basis, contain between 60 – 75 percent recycled CO₂, although there are outliers on both ends of that range); Inside the APC Industry, Regulatory Implications of ASTM-D6866. September 2007, Volume 1 Issue 1. p. 5. (suggesting a recycled CO₂ value of 60 – 75 percent). <http://www.betalabservices.com/PDF/ICAC.pdf>; Helmut Rechberger, Determination of the biogenic fraction in waste, presented at WtERT Annual Meeting in Europe, October 12-14, 2010 (suggesting a biogenic ratio of between 40 and 70 percent). Available at http://www.admas.vutbr.cz/files/wttert-prezentace/Rechberger_-_Determination_of_biogenic_fraction_of_the_waste.pdf; Institute of Clean Air Companies.

Reporting

34. The U.S. EPA has recently established mandatory reporting requirements for greenhouse gas emissions ("GHGs").³⁰ In general, the Mandatory Reporting of Greenhouse Gases Rule applies to facilities that directly emit GHGs, including Electricity Generating Facilities, that emit 25,000 metric tons of CO₂e or more per calendar year beginning in 2010.³¹ According to the EPA "[t]he purpose of the rule is to collect accurate and timely GHG data to inform future policy decisions."³² EPA requires that WTE facilities where MSW, as either the primary fuel or the only fuel with a biogenic component, is combusted in a unit, the biogenic portion of the CO₂ emissions be determined using the ASTM-D6866 analysis.³³

35. While it is not likely that the RPG WTE facility will emit enough CO₂e per year to require compliance with the EPA's rule, Staff recommends that the RPG WTE facility use the most current versions of the ASTM-D6866 analysis method, as specified in 40 CFR §98.34(d), to collect information on the biogenic portion of its CO₂ emissions on a semi-annual basis, similar to what would be required if the RPG WTE facility were to comply with the EPA's rule. Staff recommends that MEC include the information in a report filed with the Commission on a semi-annual basis until further order of the Commission, but for no less than two years.

36. Reporting of this information will provide the Commission with accurate and timely information about the use of WTE technology in Arizona and the extent to which Phoenix's MSW may be classified as renewable for purposes of generating renewable energy in the proposed WTE facility. If MEC determines, based on the results of the ASTM-D6866 analysis, that the biogenic portion of the energy produced from Phoenix's MSW is consistently greater than 75

³⁰ U.S. Environmental Protection Agency. Mandatory Reporting of Greenhouse Gases Rule. 74 FR 5620, 40 CFR Part 98. September 22, 2009; U.S. Environmental Protection Agency. Climate Change – Regulatory Initiatives, Greenhouse Gas Reporting Program. <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>

³¹ U.S. Environmental Protection Agency. Greenhouse Gas Reporting Rule (40 CFR part 98) Training. <http://www.epa.gov/reg3artd/globclimate/Part-98-Training-Complete.pdf>

³² U.S. Environmental Protection Agency. Climate Change – Regulatory Initiatives, Greenhouse Gas Reporting Program. <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>

³³ See Mandatory Greenhouse Gas Reporting, Monitoring and QA/QC requirements, 40 CFR §98.34(d)(requiring use of ASTM Standard D7459-08 sampling and ASTM Standard D6866-10 analysis of MSW samples). See also ASTM Standard D6866-10, 2010, "Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis"; ASTM Standard D7459-08, 2008, "Standard Practice for Collection of Integrated Samples for the Speciation of Biomass (Biogenic) and Fossil-Derived Carbon Dioxide Emitted from Stationary Emissions Sources" <http://www.astm.org>

1 percent, MEC may apply to the Commission to increase the allowable percentage of kWhs of
2 energy derived from the RPG WTE facility to be considered as being produced by an Eligible
3 Renewable Energy Resource, commensurate with the renewable, or biogenic, content of the
4 energy produced at the facility.

5 37. In addition, Staff has recommended that RPG also monitor the waste stream
6 entering the WTE facility to determine the categorical composition breakdown of MSW samples,
7 similar to that previously provided to Staff. MEC should provide the Commission with such
8 reports on a semi-annual basis until further order of the Commission, but for no less than two
9 years. The reports should include the following information: composition by MSW categories,
10 measured weight, percent by weight, and recycling rates.

11 **Recommendations**

12 38. Staff has recommended that the Commission grant a waiver of A.A.C. R14-2-
13 1802(A) to the limited extent necessary to recognize the RPG WTE facility as an "Eligible
14 Renewable Energy Resource" on an experimental basis such that energy produced at the facility
15 may count for "Renewable Energy Credits" under A.A.C. R14-2-1803 and be eligible to satisfy the
16 annual renewable energy requirements established by A.A.C. R14-2-1804.

17 39. Staff has further recommended that, at this time, 75 percent of the total kWhs of
18 energy derived from the RPG WTE facility be considered as being produced by an Eligible
19 Renewable Energy Resource.

20 40. Staff has recommended that MEC file MSW categorical composition breakdowns
21 and copies of ASTM-D6866 analyses with the Commission on a semi-annual basis until further
22 order of the Commission, but for no less than two years of operation of the RPG WTE facility.

23 41. Staff has also recommended that, in cooperation with Maricopa County and the
24 Arizona Department of Environmental Quality, MEC be required to develop an offsite air quality
25 monitoring program to measure the air quality impacts of this WTE facility. This plan shall be
26 submitted to the Commission (through Docket Control) prior to the WTE facility beginning
27 operation. The air quality monitoring results shall be submitted to the Commission as part of the
28 above described semi-annual reports.

CONCLUSIONS OF LAW

ORDER

1 IT IS FURTHER ORDERED that MEC file, as a compliance item in this docket, MSW
2 categorical composition breakdowns and copies of ASTM-D6866 analyses with the Commission
3 on a semi-annual basis until further order of the Commission, but for no less than two years of
4 operation of the RPG WTE facility. The semi-annual reports shall include data from January 1st
5 through June 30th and from July 1st through December 31st of each year and the reports shall be
6 docketed 45 days after the end of June and December, respectively.

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1 IT IS FURTHER ORDERED that, in cooperation with Maricopa County and the Arizona
2 Department of Environmental Quality, MEC develop an offsite air quality monitoring program to
3 measure the air quality impacts of this WTE facility. This program shall be submitted to the
4 Commission, as a compliance item in this docket, prior to the WTE facility beginning operation.
5 The air quality monitoring results shall be submitted to the Commission as part of the above
6 described semi-annual reports.

7 IT IS FURTHER ORDERED that this Order shall become effective immediately.

8
9 **BY THE ORDER OF THE ARIZONA CORPORATION COMMISSION**

10
11 _____
12 CHAIRMAN

COMMISSIONER

13
14 COMMISSIONER

COMMISSIONER

COMMISSIONER

15 IN WITNESS WHEREOF, I, ERNEST G. JOHNSON,
16 Executive Director of the Arizona Corporation Commission,
17 have hereunto, set my hand and caused the official seal of
18 this Commission to be affixed at the Capitol, in the City of
19 Phoenix, this _____ day of _____, 2011.

20 _____
21 ERNEST G. JOHNSON
22 EXECUTIVE DIRECTOR

23 DISSENT: _____

24 DISSENT: _____

25 SMO:LAF:SMH/sms
26
27
28

Decision No. _____

1 SERVICE LIST FOR: Mohave Electric Cooperative, Inc.
2 DOCKET NO. E-01750A-10-0453

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